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ABSTRACT

The data in this report are based on information supplied annually by the U.S. Civil Service Commission. A full report containing more detailed information on employment and occupational trends, work activities, and educational characteristics is prepared by the Superintendent of Documents, U.S. Government Printing Office. The mean average salary data, derived from the salary data on Federal white collar workers in October 1973, is presented and discussed. Overall trends seen in Federal scientific and technical personnel in 1973 are discussed and indicate a definite decline. Both graphic and tabulated data are presented. (EB)

nsf SCIENCE RESOURCES STUDIES HIGHLIGHTS

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Federal Scientific and Technical Personnel Decline in 1973

- Federal scientists and engineers decreased 3 percent in 1973 and nonprofessional scientific and technical personnel declined 6 percent
- The Departments of Defense (DOD) and of Agriculture (USDA) remained the largest employers of scientists and engineers in 1973 despite the greatest year-to-year decreases over 1972 among all agencies
- Women scientists and engineers in Federal employ improved their average grade level in 1973 over 1972, continuing a trend found since 1966

Overall Trends

The 161,500 Federal civilian scientists and engineers employed in October 1973 were 3 percent below the 166,700 in October 1972. This decrease, only the second decrease in these personnel since 1954 when comparable data were first kept, reduced Federal scientist and engineer employment in 1973 to its lowest level since 1968.

Scientific and engineering support personnel also decreased in 1973, dropping 6,500 below the 111,200 employed a year earlier. This decrease, following several years of decreases and minimal growth, reduced support personnel even below the 110,700 of 1968.

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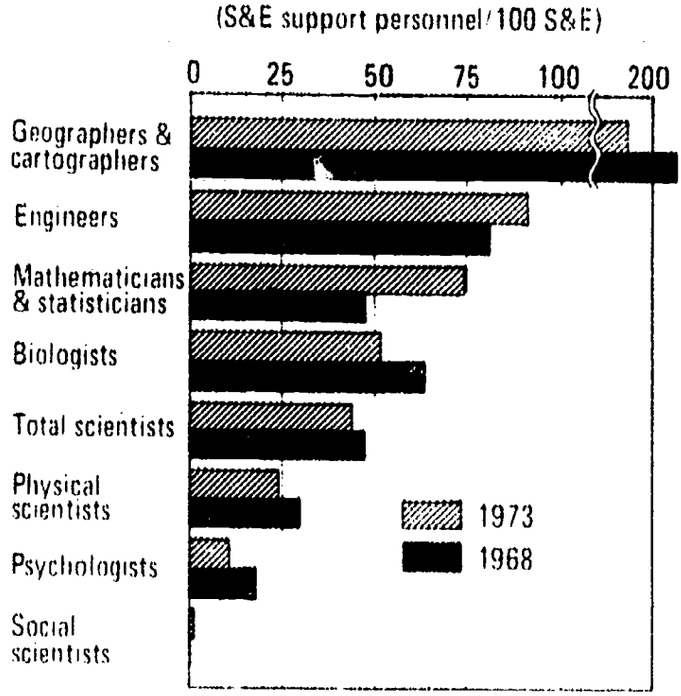
Occupational Change

All the major occupational groups of Federal scientists decreased in 1973. Decreases of 4 percent each occurred among the physical and biological scientists, and the geographers and cartographers; mathematicians and statisticians declined 2 percent; and social scientists were down 1 percent. The biological scientist (including agricultural scientists) decrease reflected largely comparable decreases among the fields of specialization in this group. For example, forestry declined 4 percent to 5,400 personnel; soil conservation 5 percent to 4,500 personnel; and agricultural management 6 percent to 3,300 personnel. Similarly, among the physical scientists, the large chemist, physicist, and meteorologist series dropped 5 percent, 3 percent, and 4 percent, respectively, to 8,000, 5,600, and 2,200 personnel. General physical scientists remained at 4,400 personnel. The major factor in the geography and cartography decline was

The ratio of Federal nonprofessional scientific and engineering personnel to Federal scientists and engineers by major group and series: October 1968 and 1973



SOURCE: National Science Foundation from U.S. Civil Service Commission data

Prepared in the Manpower Utilization Studies Group, Division of Science Resources Studies

Table 1 --Scientific and technical personnel in the Federal Government, by selected agencies and occupational group and series October 1972 and 1973

Occupational group and series	All agencies		DOD		USDA		Interior		NASA		DOT		Commerce		HEW		All other agencies	
	1972	1973	1972	1973	1972	1973	1972	1973	1972	1973	1972	1973	1972	1973	1972	1973	1972	1973
Scientific and engineering personnel, total	277 840	266 128	126 963	122 080	44 424	41 429	23 610	21 348	16 646	15 831	15 702	15 738	13 044	12 300	8 605	8 154	29 246	29 248
Scientists and engineers, total	166 672	161 492	75 188	73 138	25 758	23 671	14 140	13 848	12 496	11 984	5 293	5 399	7 603	7 172	6 311	6 037	19 883	20 243
Scientists	79 651	77 216	21 082	20 916	22 469	20 624	9 531	9 751	2 314	2 334	557	549	6 773	6 428	5 542	5 361	11 383	11 253
Engineers	87 021	84 276	54 106	52 222	3 289	3 047	4 609	4 097	10 182	9 650	4 736	4 850	830	744	769	676	8 500	8 990
Nonprofessionals, total	111 168	104 636	51 375	48 942	18 666	17 758	9 470	7 500	4 150	3 847	10 409	10 339	5 441	5 128	2 294	2 117	9 363	9 005
Scientific	37 607	36 393	6 833	6 731	14 652	14 878	6 183	5 199	205	175	201	223	4 210	4 018	1 937	1 802	3 386	3 366
Engineering and related	73 561	68 243	44 542	42 211	4 014	2 880	3 287	2 301	3 945	3 671	10 208	10 116	1 231	1 110	357	315	5 977	5 639
Scientific personnel, total	117 258	113 609	27 915	27 647	37 121	35 502	15 714	14 950	2 519	2 510	758	772	10 983	10 446	7 479	7 163	14 769	14 619
Physical sciences	35 028	34 302	13 041	12 979	2 119	2 010	4 925	4 830	1 500	1 522	269	280	7 032	6 729	2 141	2 013	4 001	3 939
Professional	27 377	26 374	10 988	10 662	1 662	1 579	3 633	3 445	1 375	1 416	189	170	4 216	3 985	1 937	1 820	3 377	3 297
Nonprofessional	7 651	7 928	2 053	2 317	457	431	1 292	1 385	125	106	80	110	2 816	2 744	204	193	624	642
Mathematics and statistics	14 501	14 017	6 636	6 438	1 216	1 188	287	260	906	877	225	231	1 870	1 744	1 185	1 119	2 176	2 160
Professional	9 715	9 510	5 225	5 160	600	592	124	111	835	817	166	179	1 181	1 063	731	717	853	871
Nonprofessional	4 786	4 507	1 411	1 278	616	596	163	149	71	60	59	52	689	681	454	402	1 323	1 289
Biological sciences	47 511	45 676	1 824	2 036	31 721	30 233	7 454	7 145	84	79	31	33	764	700	2 934	2 755	2 699	2 695
Professional	29 231	28 189	1 169	1 469	18 990	17 267	5 113	5 599	76	72	23	25	539	551	1 711	1 602	1 619	1 604
Nonprofessional	18 280	17 487	655	567	12 731	12 966	2 341	1 546	8	7	8	8	225	149	1 223	1 153	1 089	1 091
Social sciences	7 538	7 491	665	624	1 100	1 072	276	253	12	16	107	105	598	591	829	925	4 951	3 905
Professional	7 472	7 433	655	616	1 093	1 066	275	252	12	14	107	105	595	589	829	923	3 906	3 867
Nonprofessional	66	58	10	8	7	6	1	1		2			3	2		1	45	38
Geography and cartography	9 378	8 850	4 843	4 646	963	995	2 758	2 449	2	2	44	45	692	654	5	5	71	54
Professional	3 020	2 899	2 268	2 213	122	117	372	331	1	1	5	5	217	213	2	2	33	17
Nonprofessional	6 358	5 951	2 575	2 433	841	878	2 386	2 118	1	1	39	40	475	441	3	3	38	37
Psychology	2 962	2 954	886	888	1	2	7	6	15	14	65	62	25	27	380	[illegible]	[illegible]	
Professional	2 496	2 492	757	760	1	1	7	6	15	14	50	49	23	26	327	292	1 316	1 344
Nonprofessional	466	462	129	128		1					15	13	2	1	53	59	267	269
Community planning	340	319	20	36	1	2	7	7			17	16	2	1	5	4	288	253
Professional	340	319	20	36	1	2	7	7			17	16	2	1	5	4	288	253
Nonprofessional																		

Source: National Science Foundation from U.S. Civil Service Commission data

the 3-percent reduction in cartographers—to 2,600 personnel. The mathematician and statistician decrease in 1973 was based largely on a 6-percent decrease in statisticians, 3 percent in mathematicians, and a 4-percent rise in operations researchers. These series in 1973 numbered 2,200, 4,200, and 2,200 personnel, respectively. Economists, who account for well over one-half of the social scientists, remained unchanged at 4,600 personnel.

The 3-percent decrease in Federal engineers in 1973 reflected reductions of 2 percent to 6 percent in almost all major groups and series. Opposite changes were the 4-percent increase in industrial engineers—to 2,400 personnel; and 16 percent and 13 percent each in the very small ceramic and fire prevention engineering series.

The change pattern for nonprofessional scientific groups in 1973 largely mirrored the professional pattern. Biological personnel were down 4 percent, and geography and cartography, and mathematics each declined 6 percent. Engineering support personnel were down 7 percent to 68,200. Physical science personnel, however, advanced 4 percent to 7,900.

The impact of the changes in the scientist and engineer groups relative to their nonprofessional counterparts between 1968 and 1973 is seen in the chart.

Employment by Agency

Changes in Federal scientist and engineer employment between 1972 and 1973 reflect primarily decreases at the largest agencies (table 1). DOD continued as the largest employer, even though employment of such personnel declined 3 percent. USDA remained the second largest employer, but dropped 8 percent. Scientists and engineers at the Department of Health, Education, and Welfare (HEW), and the National Aeronautics and Space Administration (NASA) each declined 4 percent; and at the Department of the Interior they declined 2 percent. On the other hand, scientists and engineers at the Department of Transportation (DOT) increased 2 percent in 1973.

All the major employing agencies reduced their scientific and engineering support staffs in 1973. At Interior such personnel dropped 21 percent; at HEW, 8 percent; at NASA, 7 percent; at the Deaprtment of Commerce, 6 percent; at USDA and DOD, 5 percent; and at DOT, 1 percent. All other agencies combined also decreased in 1973—down 4 percent from the previous year

Salaries of Federal Scientists and Engineers

Federal scientists and engineers received an annual average (mean) salary of $20,900 in 1973, based on $20,200 for scientists and $21,600 for engineers (table 2). The average salary for the 70,800 male scientists was $20,400, versus $17,500 for 6,400 females. Women thus received only 86 percent as much as men. Women scientists did best in psychology, receiving 90 percent as much as males. They compared least favorably with men in the physical sciences, earning only 77 percent as much as men.

Table 2.—Mean annual salaries of Federal scientists and engineers, by selected occupational group and major series, and by sex: October 1973

Occupational group and selected series	Total	Men	Women
Scientists and engineers	$20 888	$21.037	$17 512
Scientists[1]	20.150	20 388	17 501
Physical sciences	21 791	22 110	16 977
Mathematics and statistics	21.272	21 882	18.031
Biological sciences	17 862	17 954	16 043
Social sciences	21.868	22 508	18 741
Geography and cartography	17 469	17 627	15 604
Psychology	22.175	22 484	20 208
Engineers[2]	21.564	21 586	17.665
Civil and related	19.970	19.990	16.045
Electrical and electronic	21.067	21.078	18.18?
General engineering	24,210	24.229	19.054
Mechanical and related	21.897	21.917	18.552

[1] Includes average salary for scientists in all groups and series
[2] Includes average salary for engineers in all groups and series

Source: National Science Foundation, from U.S. Civil Service Commission data

The 500 women engineers averaged $17,700, or 82 percent of the $21,600 that 83,800 men earned. The greatest discrepancy in average salary among the major engineering groups was in general engineering where women received only 79 percent of the male average salary. Women fared best in the electrical and electronic engineering group, where their salary was 86 percent of the male average.

The Status of Women Scientists and Engineers

The improvement in the average grade of women scientists and engineers noted between 1966 (the first year grade data

Grade level	Scientists			Engineers		
	1966	1972	1973	1966	1972	1973
	(percent)					
All grade levels	100 0	100 0	100 0	100 0	100 0	100 0
GS 5 11	50 7	43 8	42 7	31 0	26 8	25 6
GS 12 13	33 0	37 4	38 1	51 9	52 7	53 5
GS 14 15	13 6	16 1	16 5	15 9	19 1	19 5
GS 16 and above	2 6	[illegible]	2 6	1 2	1 4	1 4

Grade level	Scientists and engineers					
	Female			Male		
	1966	972	1973	1966	1972	1973
	(percent)					
All grade levels	100 0	100 0	100 0	100 0	100 0	100 0
GS 5 11	69 2	61 1	59 6	39 3	33 8	32 6
GS 12 13	24 6	30 6	31 8	43 5	46 0	46 8
GS 14 15	5 8	7 9	7 9	15 2	18 1	18 5
GS 16 and above	4	4	6	2 0	2 1	2 1

were tabulated) and 1972 continued in 1973. The following data compare the grade distributions of total, male, and female scientists and engineers for these years.

Technical Notes

The data in this report are based on information supplied annually by the U.S. Civil Service Commission. A full report containing more detailed information on employment and occupational trends, work activities, and educational and other characteristics will be available later this year from the Superintendent of Documents, U.S. Government Printing Office.

The mean average salary data in this report are derived from the salary data on Federal white collar workers in October 1973. In general, the salaries paid to these personnel depend on their grade level and length of service within that grade (their grade-step). Each position within an occupational series is rated as to grade, and each successively higher grade requires a higher level of duties and responsibilities. For average grade purposes, personnel in ungraded positions are assigned the grade which contains the salary at step 4 nearest the salary they receive.